

FORM PTO-1390
(REV 11-98)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

Attorney's Docket Number: **6219-0012**

**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO. (If known, see 37 CFR 15)


09/601283INTERNATIONAL APPLICATION NO.
PCT/FR99/00086INTERNATIONAL FILING DATE
18 January 1999PRIORITY DATE CLAIMED
29 January 1998TITLE OF INVENTION **FILM FOR WRAPPING OBJECTS**APPLICANT(S) FOR DO/EO/US
Daniel MEILHON

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

ITEMS 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 35 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☐ Other items or information:

U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.55) 09/601283		INTERNATIONAL APPLICATION NO. PCT/FR99/00086		ATTORNEY'S DOCKET NUMBER 6219-0012	
17. [X] The following fees are submitted: Basic National Fee (37 CFR 1.492(a)(1)-(5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445 (a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$970.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$840.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$760.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$670.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$96.00				CALCULATIONS [PTO USE ONLY]	
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$ 840.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than [] 20 [X] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$ 130.00	
Claims	Number filed	Number Extra	Rate		
Total Claims	39- 20 =	19	X \$18.00	\$ 342.00	
Dependent Claims	3- 3 =	3	X \$78.00	\$ -0-	
Multiple dependent claim(s) (if applicable)			+ \$260.00	\$ -0-	
TOTAL OF ABOVE CALCULATIONS =				\$1,312.00	
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must be filed. (NOTE 37 CFR 1.9, 1.27, 1.28).				\$ -0-	
SUBTOTAL =				\$1,312.00	
Processing fee of \$130.00 for furnishing the English translation later than [] 20 [] 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$ -0-	
TOTAL NATIONAL FEE =				\$1,312.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				\$ -0-	
TOTAL FEES ENCLOSED =				\$1,312.00	
				Amount to be refunded	\$
				charged	\$
a. [X] A check in the amount of \$ <u>1,312.00</u> to cover the above fee is enclosed. b. [] Please charge my Deposit Account No. <u>19-2380</u> in the amount of \$ _____ to cover the above fees. A duplicate of this sheet is enclosed. c. [X] The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>19-2380</u> . A duplicate copy of this sheet is enclosed.					
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO: Robert M. Schulman			 SIGNATURE		
NIXON PEABODY LLP 8180 Greensboro Drive, Suite 800 McLean, Virginia 22102			Robert M. Schulman NAME		
			31,196 REGISTRATION NUMBER		
Date: July 31, 2000					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT Application of:)
Daniel MEILHON)
Serial No. 09/601,283) U.S. Designated/Elected Office
Filed: July 31, 2000)
Based on International Application)
No. PCT/FR99/00086)
For: FILM FOR WRAPPING OBJECTS) Date: September 14, 2000

SUPPLEMENTAL PRELIMINARY AMENDMENT

Assistant Commissioner for Patents

Washington, D.C. 20231

Sir:

Further to the Preliminary Amendment filed July 31, 2000, please further amend the application identified in caption as follows:

IN THE CLAIMS

Please amend Claim 1 as follows:

1. (Twice Amended) Assembly comprising a solid and its wrapping, said wrapping comprising at least one film comprising at least one twist wrap and/or one fold, said film comprising at least one layer comprising at least one polyester, said film being essentially monolayer or multilayer and comprising at least one layer comprising at least one polyolefin.

REMARKS

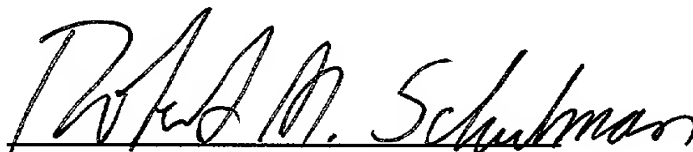
By the present Supplemental Preliminary Amendment, applicants are merely

correcting an inadvertent error made with respect to Claim 1. In particular, Claim 1 had been amended during the international examination to include, at the end, the phrase "and in this case comprising at least one layer comprising at least one polyolefin." However, in the Preliminary Amendment filed July 31, 2000, applicants had inadvertently deleted this last phrase. Accordingly, the present Supplemental Preliminary Amendment merely re-adds the recitation that at least one layer comprising at least one polyolefin is required in the assembly.

In the event that the Examiner has any questions relating to this Supplemental Preliminary Amendment or the application in general, it would be appreciated if the Examiner would telephone the undersigned attorney concerning such questions so that prosecution of this application may be expedited.

In view of the foregoing, prompt and favorable consideration of the subject application on the merits are respectfully requested.

Respectfully submitted,



Robert M. Schulman
Registration No. 31,196

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09/601283

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Docket: 6219-0012

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT Application of:)
Daniel MEILHON)
Serial No. (TO BE ASSIGNED)) U.S. Designated/Elected Office
Filed: July 31, 2000)
Based on International Application)
No. PCT/FR99/00086)
For: FILM FOR WRAPPING OBJECTS) Date: July 31, 2000

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents

Washington, D.C. 20231

Sir:

Prior to an examination on the merits, please amend the application identified in caption as follows:

IN THE SPECIFICATION

Page 1, between lines 1 and 2, insert the following:

--BACKGROUND OF THE INVENTION:

(i) Field of the Invention--;

, line 3, delete "said";

, line 5, delete "said";

, lines 13 and 14, delete "Figures 1 and 2 show, for example, sweets after wrapping in the context of the present invention."

Page 2, between lines 2 and 3, insert the following:

--(ii) Description of the Related Art--.

Page 4, line 10, change "blow-moulding" to --blow-molding--;

, between lines 14 and 15, insert the following:

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--SUMMARY AND OBJECTS OF THE INVENTION--.

Page 7, between lines 2 and 3, insert the following:

--Figures 1 and 2 show sweets after wrapping in the context of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS:--.

IN THE CLAIMS

Please amend Claims 1-35 as follows:

1. (Amended) Assembly comprising a solid and its wrapping, [the] said wrapping comprising at least one film comprising at least one twist wrap and/or one fold, [the] said film comprising at least one layer comprising at least one polyester [which can be obtained from the condensation of terephthalic acid with ethylene glycol and a diol comprising at least three carbon atoms], [the] said film being essentially monolayer or multilayer.

2. (Amended) Assembly according to Claim 1, wherein [characterized in that] the wrapping fits directly around most of the surface of the wrapped solid.

3. (Amended) Assembly according to Claim 1, wherein [one of the preceding claims, characterized in that] the solid is a foodstuff [and more particularly a sweet].

4. (Amended) Assembly according to Claim 1, wherein [one of the preceding claims, characterized in that] the wrapping is not held by an [any] adhesive or bonding agent, a [nor by any] hot or cold sealing, or [nor] by a [any] reinforcement as an overthickness to [the] said film.

5. (Amended) Assembly according to Claim 1, wherein [one of the preceding claims, characterized in that] the polyester is amorphous.

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6. (Amended) Assembly according to Claim 1, wherein [one of the preceding claims, characterized in that] the film comprises a plane of symmetry which is parallel to it, [the] said symmetry applying both to the geometry and to the composition of [the] said film.

7. (Amended) Assembly according to Claim 1, wherein [one of the preceding claims, characterized in that] the sum of the mass of the layers comprising the polyester comprises [represents] at least 20% by weight of the mass of the film.

8. (Amended) Assembly according to Claim 1, wherein [one of the preceding claims, characterized in that] the film comprises at least three layers, two of which comprise outer layers comprising at least the polyester and one of which comprises a middle layer comprising at least one polyolefin [is found in the middle].

9. (Amended) Assembly according to Claim 8, wherein [the preceding claim, characterized in that] the sum of the mass of the three layers comprises [constitutes] at least 80% of the total mass of the film and [in that] each of [the] said three layers comprises [constitutes] at least 10% by weight of the total mass of the film.

10. (Amended) Assembly according to Claim 8, wherein [either of Claims 8 and 9, characterized in that] the middle layer comprises at least 60% of an ethylene polymer.

11. (Amended) Assembly according to Claim 8, wherein [one of Claims 8 to 10, characterized in that] the middle layer comprises [represents] 40 to 80% by weight of the mass of the film.

12. (Amended) Assembly according to Claim 12, wherein [one of the preceding claims, characterized in that] the diol is cyclohexanedimethanol.

13. (Amended) Assembly according to Claim 12, wherein [the preceding claim,

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characterized in that] the diacid component of the polyester comprises 70 to 100 mol% of terephthalic acid and 0 to 30 mol% of another acid chosen from isophthalic acid, naphthalenedicarboxylic acid and 1,4-cyclohexanedicarboxylic acid or mixtures thereof, and [in that] the diol component of the polyester comprises 2 to 99 mol% of 1,4-cyclohexanedimethanol and from 1 to 98 mol% of ethylene glycol.

14. (Amended) Assembly according to Claim 13, wherein [the preceding claim, characterized in that] the diacid component of the polyester comprises 80 to 100 mol% of terephthalic acid and 0 to 20 mol% of isophthalic acid, and [in that] the diol component of the polyester comprises 25 to 40 mol% of 1,4-cyclohexanedimethanol and from 75 to 60 mol% of ethylene glycol.

15. (Amended) Assembly according to Claim 1, wherein [one of the preceding claims, characterized in that] the film comprises at least one antiblocking agent and/or at least one antistatic agent and/or at least one release agent.

16. (Amended) Assembly according to Claim 1, wherein [one of the preceding claims, characterized in that the] film has undergone printing and/or metallization.

17. (Amended) Assembly according to Claim 1, wherein [one of the preceding claims, characterized in that the] film has a thickness of from 10 to 60 μm .

18. (Amended) Film comprising multiple layers, at least one layer comprising at least one polyester [which can be] obtained from the condensation of a diacid component comprising terephthalic acid with ethylene glycol and a diol component comprising at least three carbon atoms, and [the said film being multilayer, comprising] at least one layer of polyolefin, and comprising a plane of symmetry which is parallel to it, [the] said symmetry applying both to the geometry and to the composition of the said film.

19. (Amended) Film according to Claim 18, wherein [the preceding claim,

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characterized in that] the polyester is amorphous.

20. (Amended) Film according to Claim 19, wherein [either of Claims 18 and 19, characterized in that] the sum of the mass of the layers comprising the polyester comprises [represents] at least 20% by weight of the mass of the film.

21. (Amended) Film according to Claim 20, comprising [one of Claims 18 to 20, characterized in that it comprises] at least three layers, two of which comprise outer layers comprising at least the polyester and one of which comprises a middle layer comprising at least one polyolefin [is found in the middle].

22. (Amended) Film according to Claim 21, wherein [the preceding claim, characterized in that] the sum of the mass of the three layers comprises [constitutes] at least 80% of the total mass of the film and [in that] each of [the] said three layers comprises [constitutes] at least 10% by weight of the total mass of the film.

23. (Amended) Film according to Claim 22, wherein [either of Claims 21 and 22, characterized in that] the middle layer comprises at least 60% of an ethylene polymer.

24. (Amended) Film according to Claim 21, wherein [one of Claims 21 to 23, characterized in that] the middle layer comprises [represents] 40 to 80% by weight of the mass of the film.

25. (Amended) Film according to Claim 18, wherein [one of Claims 18 to 24, characterized in that] the diol is cyclohexanedimethanol.

26. (Amended) Film according to Claim 25, wherein [the preceding claim, characterized in that] the diacid component of the polyester comprises 70 to 100 mol% of terephthalic acid and 0 to 30 mol% of another acid chosen from isophthalic acid, naphthalenedicarboxylic acid and 1,4-cyclohexanedicarboxylic acid or mixtures thereof, and [in that] the diol component of the polyester comprises 2 to 99 mol% of 1,4-

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cyclohexanedimethanol and from 1 to 98 mol% of ethylene glycol.

27. (Amended) Film according to Claim 26, wherein [the preceding claim, characterized in that] the diacid component of the polyester comprises 80 to 100 mol% of terephthalic acid and 0 to 20 mol% of isophthalic acid, and [in that] the diol component of the polyester comprises 25 to 40 mol% of 1,4-cyclohexanedimethanol and from 75 to 60 mol% of ethylene glycol.

28. (Amended) Film according to Claim 18, further comprising [one of Claims 18 to 27, characterized in that it comprises] at least one antiblocking agent and/or at least one antistatic agent and/or at least one release agent.

29. (Amended) Film according to Claim 18, wherein [one of Claims 18 to 28, characterized in that] the film has undergone printing and/or metallization.

30. (Amended) Film according to Claim 18, having [one of Claims 18 to 29, characterized in that it has] a thickness of from 10 to 60 μm .

31. (Amended) Process for manufacturing a film according to Claim 18, comprising extruding or blow-molding co-extruding [one of Claims 18 to 30, characterized in that it comprises a step of extrusion or blow-moulding coextrusion] of the [various thermoplastic compositions from which the] various layers of [the] said film [are derived].

32. (Amended) Process according to Claim 31, wherein [the preceding claim, characterized in that] the operating parameters of the blow-molding [blow-moulding] extrusion or coextrusion step are as follows:

- drawing rate: 2 to 50,
- blowing rate: 1 to 10,
- air-gap: 0.5 to 5 mm
- drawing speed: 10 to 150 m/min.

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33. (Amended) Process according to Claim 32, wherein [the preceding claim, characterized in that] the operating parameters of the blow-molding [blow-moulding] extrusion or coextrusion step are as follows:

- drawing rate: 10 to 30,
- blowing rate: 1.5 to 3,
- air-gap: 0.8 to 1.6 mm
- drawing speed: 30 to 60 m/min.

34. (Amended) Process according to Claim 31, wherein [one of Claims 31 to 33, characterized in that] the blow-molding [blow-moulding] extrusion or coextrusion step is followed by at least one step of drawing or of double-drawing.

35. (Amended) Process according Claim 31, wherein [to one of Claims 31 to 34, characterized in that] the film undergoes at least one step of antistatic treatment and/or of metallization and/or of printing.

Please add new claims 36-39 as follows:

--36. Assembly according to Claim 1, comprising at least one layer comprising at least one polyolefin.

37. Assembly according to Claim 1, wherein said polyester comprises a condensation product of a diacid component comprising terephthalic acid with ethylene glycol and a diol component comprising at least three carbon atoms.

38. Assembly according to Claim 3, wherein the foodstuff is a sweet.

39. A wrapped food product comprising (i) the food product; and (ii) a polyester film comprising at least one of a twist wrap and a fold, said wrapped food product not including an adhesive or bonding agent.--

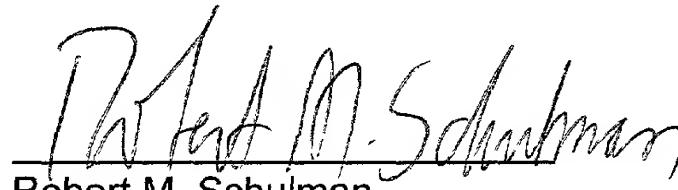
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REMARKS

By the present Preliminary Amendment, applicants have amended the specification to correct minor typographical and idiomatic errors and to add the headings suggested by the U.S. Patent and Trademark Office. Applicants have further amended the amended claims to better conform with standard U.S. practice. In this regard, applicants note that they have also added new Claims 36-39.

Entry of the foregoing and prompt and favorable consideration of the subject application on the merits are respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Robert M. Schulman", is written over a horizontal line.

Robert M. Schulman
Registration No. 31,196

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ABSTRACT OF THE DISCLOSURE

Assembly comprising a solid and its wrapping, the wrapping comprising at least one film comprising at least one twist wrap and/or one fold, the film comprising at least one layer comprising at least one polyester, the film being essentially monolayer or multilayer.

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FILM FOR WRAPPING OBJECTS

5 The invention relates to an assembly comprising
a solid and its wrapping, the said wrapping comprising
at least one film comprising at least one twist wrap
and/or one fold, the said film comprising at least one
layer comprising at least one polyester. The invention
relates directly to the field of wrapping for
foodstuffs, for instance confectionery such as
chocolates, sweets, raw sugars or caramels, chewing-
gums and lollipops, as well as to that of any other
solid object, for instance soaps, cheeses in portions
and culinary additives in doses, for instance stock
cubes. Figures 1 and 2 show, for example, sweets after
wrapping in the context of the present invention.

15 The wrapping with which the present application
is concerned can thus be a film which fits directly
around most, if not virtually all, of the surface of
the wrapped solid, the latter generally consisting of a
single component (in contrast, for example, with a
powder consisting of several components in the form of
particles), as is the case, for example, for a sweet.
Needless to say, in the context of the present
invention, the assembly can comprise

- the solid object,
- 25 - which is itself first wrapped with a first
film or paper, which may be metallized,
- which is itself wrapped with the film
comprising at least one twist wrap and/or one

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fold and comprising at least one layer
comprising at least one polyester.

According to the prior art, the sweets can be wrapped using films made of polyvinyl chloride (PVC) or
5 of cellophane. PVC is generally being replaced and is moreover of high density, such that it makes batches of wrapped sweets substantially heavier. Cellophane is manufactured by a complex process which makes it expensive, and increasingly fewer manufacturers make
10 it. There is thus a need for products to replace these two materials, in particular in the field of films for wrapping solid objects such as sweets.

A film which is suitable for wrapping a solid should satisfy several technical criteria.

15 In particular, the film should be suitable for wrapping, i.e. it should retain the shape given to it during wrapping with the least possible tendency to return to its original shape, i.e. that of a flat film. This property makes it possible to avoid having to use
20 an adhesive or a glue, for example on the narrowest part of a twist wrap, i.e. between the wrapped solid and the twist wrap itself, in order to keep the wrapping in the shape given to it.

The film's tendency not to retain the shape
25 which it has been attempted to give it is more particularly difficult to overcome when it is desired to give the wrapped solid one or more twist wraps, such as for the sweets represented in Figure 1.

The aptitude of a film to wrap a solid in order to produce a wrapping comprising at least one twist wrap and/or one fold can readily be tested by observing whether a twist wrap has a tendency to become undone
5 once it has been formed. This test can be carried out by forming a twist wrap from a half-turn, i.e. by making the part of the film which does not hold the solid undergo a 1/2 turn relative to the wrapped solid.

A film for wrapping solid objects should also
10 be easily manipulable by the machines responsible for wrapping the said objects, these machines being expected to run at the highest possible rates, for example 50 to 1500 objects wrapped per minute and per machine.

15 The film should also be easy to cut. The reason for this is that, before wrapping an object, it is necessary to cut out the area of film needed to wrap the said object, generally from a reel of the said film. Before wrapping the object, before and after
20 mechanical cutting, the film should remain entirely flat and should show no tendency to roll up. Such a tendency could disrupt the production line and cause it to become blocked.

Furthermore, depending on the case, the film
25 may need to have good sheen and/or suitable transparency, and/or correct suitability for contact with food and/or satisfactory organoleptic properties.

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Where appropriate, the film should have correct suitability for printing and/or metallization.

Furthermore, the film should be easy to manufacture from its raw materials.

5 A monomaterial film made of bioriented high-density polyethylene or of bioriented polypropylene does not satisfactorily meet the schedule of conditions for the application envisaged, in particular since it is relatively unsuitable for wrapping. Furthermore,
10 these materials extruded by the blow-moulding extrusion process, commonly known as the "bubble" process, have mediocre optical properties on account of the presence of nodules at the surface, which cause light to be diffracted.

15 The film of the invention satisfies the above-mentioned problems. In particular, the film according to the invention allows a solid to be wrapped in wrapping comprising at least twist wrap and/or fold without it being necessary to use an adhesive or
20 bonding agent. In particular, it is not necessary for the film itself to act as bonding agent, which would in some way be the case if the film was hot-sealed on itself to keep the wrapping sufficiently closed. Thus, the film according to the invention allows the
25 production of a wrapping which is kept closed around an object merely by producing at least one twist wrap (also known as a "curlpaper") and/or at least one fold, without there being the obligatory need to use cold or

hot sealing at any point in the wrapping after enveloping the object. To produce this wrapping, it is no longer necessary either to attach to the film, and thus as an over-thickness to the said film,

5 reinforcements such as, for example, foldable rods which may be metallic, so as to hold the wrapping around its contents by means of the nonelastic folds exerted on the said rods.

The film used in the context of the present
10 invention comprises at least one layer comprising at least one polyester. It can thus be an essentially monolayer film or a multilayer film. This film generally has a thickness ranging from 5 to 100 μm and more generally from 10 to 60 μm .

15 The film is said to be essentially monolayer if its manufacture has required the extrusion of only a single thermoplastic material, even if, where appropriate, it has received the usual finishing layers, such as a layer of metallization and/or of
20 printing and/or of coating with an antistatic agent, subsequent to the said extrusion.

The film is said to be multilayer in the context of the present application if it comprises at least two layers of different thermoplastic materials.

25 Preferably, the film comprises a plane of symmetry which is parallel to it, the said symmetry applying both to the geometry and to the composition of the film. This implies that if the film is multilayer

and comprises at least two layers of different composition, the film necessarily comprises at least three layers.

The sum of the mass of the layers comprising a polyester can represent at least 20% by weight of the mass of the film.

The film can consist of at least three main layers, one of which, which is of different composition to the other two, is found in the middle of the film, such that it includes the plane of symmetry of the film. The expression "three main layers" is understood to mean that the sum of the mass of these three layers constitutes at least 80% of the total mass of the film and that each of these three layers obtained from a thermoplastic material constitutes at least 10% by weight of the total mass of the film.

For the case of a film comprising at least three main layers in the sense given above, the middle layer can comprise at least one polyolefin and the other two layers, which are substantially identical, can comprise at least one polyester.

The film comprising at least three main layers in the sense given above has an excellent aptitude for tearing (substantially linear tearing) in all directions, in particular both in the direction of the coextrusion and in the direction perpendicular to that of coextrusion. The film is thus also particularly

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suitable for applications requiring good tearability in the direction perpendicular to that of coextrusion.

Throughout the present application, whenever mention is made of a layer "based on" a certain material, this means that the layer comprises at least 60% by weight of the said material.

According to one variant, the film comprises at least one layer comprising at least one polyester and at least one layer comprising at least one polyolefin.

10 The film according to the invention preferably comprises at least one layer of polyester, the said film being essentially monolayer, or the said film being multilayer and in this case comprising at least one layer comprising at least one polyolefin.

15 The term polyolefin is understood to refer to a polymer of at least one olefin, the term polymer needing to be taken in the broad sense, such that it covers the notions of homopolymer, of copolymer, of terpolymer, of interpolymer, or of a mixture of
20 polymers. As olefin, mention may be made of ethylene, propylene, butene, hexene and 1-octene. As polyolefin, a propylene or ethylene polymer is preferred, the latter being even more preferred. The polymer of at least one olefin can thus come from the polymerization
25 of at least one olefin with at least one other monomer, which can be an olefin or another monomer such as, for example, vinyl acetate, maleic anhydride or an acrylic ester.

For the case of a film comprising at least three main layers in the sense given above, the middle layer is advantageously based on an ethylene polymer. This ethylene polymer can be such that at least 80% of
5 the monomer units constituting it are ethylene.

The term polyester is understood to refer to a polymer comprising at least one ester function as repeating unit, the term polymer here also covering the notions of homopolymer, of copolymer, of terpolymer, of
10 interpolymer and of a mixture of polymers.

The polyester can come from the condensation of terephthalic acid with at least one diol.

The polyester can be chosen from amorphous and semicrystalline polyesters. The term "amorphous" means
15 that the polyester has less than 15% crystallinity and preferably less than 10% crystallinity.

Amorphous and semicrystalline polyesters can be produced by processes that are known per se. Thus, amorphous polyesters are usually produced by melt phase
20 techniques and crystalline polyesters are usually produced by a combination of melt phase and solid phase polycondensation procedures.

Preferably, the polyester is amorphous.

A polyester is usually prepared by poly-
25 condensation of one or more diacid(s) (also known as dibasic acid) with one or more diol(s) (also known as glycol(s)). It is recalled that a polyester obtained from a polycondensation medium comprising terephthalic

acid and ethylene glycol is usually known as "polyethylene terephthalate" and usually denoted by the abbreviation "PET".

5 A preferred polyester is a copolymer which can come from the condensation (also known as polycondensation) of terephthalic acid with ethylene glycol and a diol comprising at least three carbon atoms. Such a polyester is usually known as "polyethylene terephthalate glycol" and usually denoted
10 by the abbreviation "PETG".

This means that the polycondensation medium comprises terephthalic acid, ethylene glycol, a diol comprising at least three carbon atoms and, if necessary, other diacids and/or other diols.

15 One polyester which is particularly suitable is a copolymer derived from the copolymerization (in fact polycondensation) of terephthalic acid with ethylene glycol and cyclohexanedimethanol, in particular when it is amorphous. This means that the polycondensation
20 medium comprises terephthalic acid, ethylene glycol, cyclohexanedimethanol and, if necessary, other diacids and/or other diols, the final polyester being more particularly suitable when it is amorphous.

Thus, the diacid component of the polyester can
25 comprise 70 to 100 mol% of terephthalic acid and 0 to 30 mol% of another acid chosen from isophthalic acid, naphthalenedicarboxylic acid and 1,4-cyclohexanedicarboxylic acid or mixtures thereof.

Preferably, the diacid component contains from 80 to 100 mol% of terephthalic acid and 0 to 20 mol% of isophthalic acid.

The diacid component can be modified by a small amount, i.e. up to 10 mol%, of a diacid containing 4 to 40 carbon atoms, such as an isomer of naphthalenedicarboxylic acid or mixtures thereof, the 1,4-, 1,5-, 2,6- and 2,7-isomers being preferred, or such as a cis or trans isomer or a mixture of cis/trans isomers of 1,4-cyclohexanedicarboxylic acid, or such as sulphoisophthalic acid.

The diol component of the polyester can be derived from diols (i.e. glycols) comprising 2 to 10 carbon atoms, and mixtures thereof. Preferably, the diol component contains 2 to 99 mol% of 1,4-cyclohexanedimethanol and from 1 to 98 mol% of ethylene glycol, and preferably 25 to 40 mol% of 1,4-cyclohexanedimethanol and 75 to 60 mol% of ethylene glycol.

The diol component can be modified with up to 20 mol% of other glycols such as diethylene glycol, neopentyl glycol, 1,4-butanediol, 1,5-pentanediol, 1,6-hexanediol, 1,8-octanediol, 2,2,4-trimethyl-1,3-pentanediol, propylene glycol or 1,3-propylenediol.

The polyester can be chosen from those whose intrinsic viscosity ranges from 0.4 to 1.5 dL/g, and preferably from 0.6 to 1.2 dL/g, the said viscosity being determined at 25°C using 0.25 g of polymer per

100 ml of a solvent composed of 60% by weight of phenol and 40% by weight of tetrachloroethane.

For the case of a film comprising at least three main layers in the sense given above, the middle
5 layer can represent 40 to 80% by weight of the mass of the film.

For the case of a film comprising at least three main layers in the sense defined above, mention may be made, for example, of the combination in which
10 the middle layer is based on an ethylene polymer and represents from 40 to 80% by weight of the mass of the film, each of the other two layers being based on a polyester which is a copolymer derived from the condensation of terephthalic acid with ethylene glycol
15 and a diol comprising at least three carbon atoms, each of these two other layers representing from 10 to 30% of the mass of the film, the said polyester preferably being amorphous, and the said diol comprising at least three carbon atoms and possibly being
20 cyclohexanedimethanol.

Where appropriate, when the film is multilayer, the film can comprise one or more binders, interface-adhesion promoters, between the various layers. Such binders are generally present between the layers of the
25 film in an amount of from 1 to 5 μm .

It is also possible to mix one or more binder(s) with at least one of the materials constituting at least one of the layers of the film, so

as to increase the compatibility and thus the adhesion
of the said layer to at least one of the layers
adjacent to it. Generally, such a binder can be present
in the chosen layer in a proportion of from 10 to 40%
5 by weight.

Needless to say, at least one of the
ingredients (binder and/or thermoplastic resin) which
are useful for manufacturing the film can contain at
least one adjuvant or additive, such as a dye or
10 pigment, antioxidant, anti-UV agent, release agent or
antiblocking agent, incorporated in the usual manner
and known to those skilled in the art, taking into
account the ingredient chosen. For the case of a
multilayer film and when this film is intended to wrap
15 a foodstuff, it may be preferred, depending on the
case, to incorporate the adjuvant or additive into the
middle layer of the film, if it is desired to lower the
risk of contamination of the foodstuff finally wrapped,
by the said adjuvant or additive.

20 At least one release agent can be incorporated
into at least one ingredient of the film, prior to its
preparation by extrusion or coextrusion. If the film is
multilayer, the release agent is preferably
incorporated into the outermost coextruded layers. Such
25 a release agent can be chosen, for example, from fatty
acid amides such as erucamide and can be introduced in
a proportion of from 200 to 5000 ppm into the

thermoplastic material from which the layer(s) of the film containing this release agent will be obtained.

In general, such a release agent is incorporated into the film if there is no intention to
5 metallize it or to print on it.

At least one antiblocking agent can be incorporated into at least one ingredient of the film, prior to its preparation by extrusion or coextrusion.

When the film comprises several layers, the
10 antiblocking agent is preferably introduced so as to be present towards the outer layers of the film, for example the two outermost layers which have been coextruded, but which are found just beneath the non-coextruded layer(s), i.e. the layers of printing and/or
15 of metallization and/or of coating with an antistatic agent, if the latter operations are intended.

The function of this antiblocking agent is to lower the tendency of the film to adhere to itself when it is wound on a reel, so as to facilitate its
20 unwinding. Such an antiblocking agent generally comprises inorganic filler particles such as silica and can be incorporated into at least one of the layers in the form of an inorganic filler/thermoplastic resin master mixture.

25 When the antiblocking agent comprises an inorganic filler, the antiblocking agent can be incorporated into at least one layer such that the

inorganic filler is present in the said layer in a proportion of from 100 to 10,000 ppm.

Prior to its use for wrapping objects, it is possible to give the film antistatic properties. These
5 antistatic properties allow the film to remain entirely flat and to slide smoothly on the manufacturing machines, without showing any tendency to become rolled up, which would run the risk of disrupting or even blocking the entire manufacturing process.

10 The film can be provided with these antistatic properties on the basis of principles known to those skilled in the art, i.e. either by supplying at least one antistatic agent in at least one of the ingredients (resin and/or binder) forming part of the composition
15 of the film, prior to the manufacture of the film, or by coating the film on its outer layers using a solution of an antistatic agent, or alternatively by any other appropriate means. Antistatic agents from the alkylamine family are known to those skilled in the
20 art.

In general, the coating with an antistatic agent corresponds to a final surface treatment of the film, such that it results in the production of the outer layers of the film.

25 This coating with an antistatic agent is thus carried out in particular after the optional printing step.

In general, it is not necessary to use coating with an antistatic agent if the film has been metallized.

When it is desired to apply printing and/or metallization to the film, it is preferable to carry out a corona treatment on the film prior to the said printing and/or metallization. Such a corona treatment can be applied to the film according to the invention, on the basis of the principles known to those skilled in the art. Nevertheless, if the film is essentially monolayer or prepared such that its outermost coextruded layers contain at least one polyester, a satisfactory metallization result is obtained even in the absence of a corona treatment.

The film used in the context of the invention can be obtained, for example, by extrusion or coextrusion through a flat die (often referred to as "cast" extrusion) or by blow-moulding extrusion or coextrusion (also known as "tubular" (co)extrusion). The term extrusion applies to the preparation of a monolayer film, whereas the term coextrusion applies to the preparation of a film comprising at least two layers.

In the process of extrusion or coextrusion through a flat die, a flat film is extruded or coextruded and deposited continuously on a cooling cylinder also known as a "chill-roll".

After extrusion or coextrusion through a flat die, the film preferably undergoes monoaxial or biaxial drawing (producing mono- or biorientation respectively) on the basis of the principles known to those skilled in the art. Monoaxial drawing is carried out in the direction of the extrusion or coextrusion ("machine direction"), whereas biaxial drawing is carried out both in the direction of the extrusion or coextrusion and in the direction perpendicular to that of extrusion or coextrusion. The use of the "cast" process makes it possible to benefit from a surfacing effect of the chill roll, leading to a particularly smooth film which consequently has an attractive surface state.

The mono- or biorientation has the effect especially of increasing the density of the film and of lowering its resistance to the flow threshold.

The drawing or the double-drawing can be carried out continuously or "in resumption mode", i.e. after the film has been wound on a reel and stored momentarily immediately after having been extruded or coextruded or after having undergone a first drawing.

In the blow-moulding extrusion or coextrusion process, the film is extruded or coextruded in the form of a cylindrical bubble obtained by blowing from a circular die. For this process, the drawing rate can range from 2 to 50 and preferably from 10 to 30, the blowing rate can range from 1 to 10 and preferably from 1.5 to 3 and the air-gap can range from 0.5 to 5 mm and

preferably from 0.8 to 1.6 mm. The drawing speed can be varied in order to have an influence on the thickness of the film. Generally, the drawing speed can range from 10 to 150 m/min and preferably from 30 to
5 60 m/min.

When it is desired to carry out a double-drawing which is very sensitive on the film, the extrusion or coextrusion can be carried out by applying the "double-bubble" process, the two "bubbles" of the
10 said process being produced one after the other, generally continuously.

EXAMPLE 1

An example of the production and use of a three-layer film of the polyester/polyolefin/polyester
15 type is now described. In this example, the starting materials are denoted by the abbreviations whose meanings are given in this table:

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ABBREVIATION	NATURE	ORIGIN	BRAND NAME
PETG	Polyethylene terephthalate glycol (modified with 1,4-cyclohexane- dimethanol)	Eastman	Eastar 6763
MDPE	Medium-density polyethylene	BASF	Lupolen 3220 K
HDPE	High-density polyethylene	DSM	Stamylex 9089F
Terpolymer	Ethylene/acrylic ester/maleic anhydride	DuPont	Bynel CXA 4033
AB	Antiblocking agent in the form of a master mixture comprising 10% by weight of silica and 90% by weight of PET, of brand name Eastar 6763	Eastman	COO47

The three layers of the film are described in
this table:

LAYER	WEIGHT PERCENTAGE IN THE FILM	COMPOSITION (% BY WEIGHT)
1st outer layer	20%	95% PETG + 5% AB
Inner layer	60%	50% MDPE + 30% HDPE + 20% terpolymer
2nd outer layer	20%	95% PETG + 5% AB

The film was prepared by tubular coextrusion under the following conditions:

- screw temperature of the PETG/AB mixture: 220°C
- screw temperature of the MDPE/HDPE/terpolymer mixture: 180°C
- die temperature: 190°C
- head temperature: 200°C
- drawing rate: 20
- blowing rate: 2
- air-gap: 1.2 mm
- drawing speed: 40 m/min

The film obtained has a width of 800 mm, a total thickness of 28 μ m and a density of about 1.1.

A 60 mm \times 90 mm rectangle is cut out from the film and a sweet is wrapped manually by making a twist wrap by rotating the film by 1/2 in one hand relative to the sweet held by the other hand. It is observed that the twist wrap has no pronounced tendency to become undone.

EXAMPLE 2 (comparative)

A 60 mm \times 90 mm rectangle is cut out of a bioriented polypropylene film and a sweet is wrapped in the same way as in Example 1. It is observed that the twist wrap has a pronounced tendency to become undone.

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CLAIMS

1. Assembly comprising a solid and its
wrapping, the said wrapping comprising at least one
film comprising at least one twist wrap and/or one
5 fold, the said film comprising at least one layer
comprising at least one polyester which can be obtained
from the condensation of terephthalic acid with
ethylene glycol and a diol comprising at least three
carbon atoms, the said film being essentially monolayer
10 or multilayer and in this case comprising at least one
layer comprising at least one polyolefin.

2. Assembly according to Claim 1,
characterized in that the wrapping fits directly around
most of the surface of the wrapped solid.

15 3. Assembly according to one of the
preceding claims, characterized in that the solid is a
foodstuff and more particularly a sweet.

4. Assembly according to one of the
preceding claims, characterized in that the wrapping is
20 not held by any adhesive or bonding agent, nor by any
hot or cold sealing, nor by any reinforcement as an
overthickness to the said film.

5. Assembly according to one of the
preceding claims, characterized in that the polyester
25 is amorphous.

6. Assembly according to one of the
preceding claims, characterized in that the film
comprises a plane of symmetry which is parallel to it,

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the said symmetry applying both to the geometry and to the composition of the said film.

7. Assembly according to one of the preceding claims, characterized in that the sum of the mass of the layers comprising the polyester represents at least 20% by weight of the mass of the film.

8. Assembly according to one of the preceding claims, characterized in that the film comprises at least three layers, two of which comprise at least the polyester and one of which comprising at least one polyolefin is found in the middle.

9. Assembly according to the preceding claim, characterized in that the sum of the mass of the three layers constitutes at least 80% of the total mass of the film and in that each of the said three layers constitutes at least 10% by weight of the total mass of the film.

10. Assembly according to either of Claims 8 and 9, characterized in that the middle layer comprises at least 60% of an ethylene polymer.

11. Assembly according to one of Claims 8 to 10, characterized in that the middle layer represents 40 to 80% by weight of the mass of the film.

12. Assembly according to one of the preceding claims, characterized in that the diol is cyclohexanedimethanol.

13. Assembly according to the preceding claim, characterized in that the diacid component of

the polyester comprises 70 to 100 mol% of terephthalic acid and 0 to 30 mol% of another acid chosen from isophthalic acid, naphthalenedicarboxylic acid and 1,4-cyclohexanedicarboxylic acid or mixtures thereof, and in that the diol component of the polyester comprises 2 to 99 mol% of 1,4-cyclohexanedimethanol and from 1 to 98 mol% of ethylene glycol.

14. Assembly according to the preceding claim, characterized in that the diacid component of the polyester comprises 80 to 100 mol% of terephthalic acid and 0 to 20 mol% of isophthalic acid, and in that the diol component of the polyester comprises 25 to 40 mol% of 1,4-cyclohexanedimethanol and from 75 to 60 mol% of ethylene glycol.

15. Assembly according to one of the preceding claims, characterized in that the film comprises at least one antiblocking agent and/or at least one antistatic agent and/or at least one release agent.

20. 16. Assembly according to one of the preceding claims, characterized in that the film has undergone printing and/or metallization.

17. Assembly according to one of the preceding claims, characterized in that the film has a thickness of from 10 to 60 μm .

18. Film comprising at least one layer comprising at least one polyester which can be obtained from the condensation of terephthalic acid with

ethylene glycol and a diol comprising at least three carbon atoms, the said film being multilayer, comprising at least one layer of polyolefin, and comprising a plane of symmetry which is parallel to it, 5 the said symmetry applying both to the geometry and to the composition of the said film.

19. Film according to the preceding claim, characterized in that the polyester is amorphous.

20. Film according to either of Claims 18 10 and 19, characterized in that the sum of the mass of the layers comprising the polyester represents at least 20% by weight of the mass of the film.

21. Film according to one of Claims 18 to 20, characterized in that it comprises at least three 15 layers, two of which comprise at least the polyester and one of which comprising at least one polyolefin is found in the middle.

22. Film according to the preceding claim, characterized in that the sum of the mass of the three 20 layers constitutes at least 80% of the total mass of the film and in that each of the said three layers constitutes at least 10% by weight of the total mass of the film.

23. Film according to either of Claims 21 25 and 22, characterized in that the middle layer comprises at least 60% of an ethylene polymer.

24. Film according to one of Claims 21 to 23, characterized in that the middle layer represents 40 to 80% by weight of the mass of the film.

25. Film according to one of Claims 18 to 24, characterized in that the diol is cyclohexanedimethanol.

26. Film according to the preceding claim, characterized in that the diacid component of the polyester comprises 70 to 100 mol% of terephthalic acid and 0 to 30 mol% of another acid chosen from isophthalic acid, naphthalenedicarboxylic acid and 1,4-cyclohexanedicarboxylic acid or mixtures thereof, and in that the diol component of the polyester comprises 2 to 99 mol% of 1,4-cyclohexanedimethanol and from 1 to 98 mol% of ethylene glycol.

27. Film according to the preceding claim, characterized in that the diacid component of the polyester comprises 80 to 100 mol% of terephthalic acid and 0 to 20 mol% of isophthalic acid, and in that the diol component of the polyester comprises 25 to 40 mol% of 1,4-cyclohexanedimethanol and from 75 to 60 mol% of ethylene glycol.

28. Film according to one of Claims 18 to 27, characterized in that it comprises at least one antiblocking agent and/or at least one antistatic agent and/or at least one release agent.

29. Film according to one of Claims 18 to 28, characterized in that the film has undergone printing and/or metallization.

30. Film according to one of Claims 18 to 29, characterized in that it has a thickness of from 10 to 60 μm .

31. Process for manufacturing a film according to one of Claims 18 to 30, characterized in that it comprises a step of extrusion or blow-moulding coextrusion of the various thermoplastic compositions from which the various layers of the said film are derived.

32. Process according to the preceding claim, characterized in that the operating parameters of the blow-moulding extrusion or coextrusion step are as follows:

- drawing rate: 2 to 50,
- blowing rate: 1 to 10,
- air-gap: 0.5 to 5 mm
- drawing speed: 10 to 150 m/min

33. Process according to the preceding claim, characterized in that the operating parameters of the blow-moulding extrusion or coextrusion step are as follows:

- drawing rate: 10 to 30,
- blowing rate: 1.5 to 3,
- air-gap: 0.8 to 1.6 mm
- drawing speed: 30 to 60 m/min

34. Process according to one of Claims 31 to 33, characterized in that the blow-moulding extrusion or coextrusion step is followed by at least one step of drawing or of double-drawing.

5 35. Process according to one of Claims 31 to 34, characterized in that the film undergoes at least one step of antistatic treatment and/or of metallization and/or of printing.

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63) <input type="checkbox"/> Declaration Submitted With Initial Filing OR <input type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)	Attorney Docket Number	6219-0012
	First Named Inventor	Daniel MEILHON
	COMPLETE IF KNOWN	
	Application Number	09/601,283
	Filing Date	July 31, 2000
	Group Art Unit	
	Examiner Name	

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

FILM FOR WRAPPING OBJECTS
(Title of the Invention)

the specification of which

☐ is attached hereto OR ☒ [X] was filed on (MM/DD/YYYY) July 31, 2000 As United States Application Number or PCT International Application Number 09/601,283 And was amended on (MM/DD/YYYY) July 31, 2000 (If applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

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98 00983	France	01/29/98	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

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I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)
PCT/FR99/00086	January 18, 1999	

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As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: [X] Customer Number 22204

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